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Under Investigation by NIH—Since 1982

Part I: Chronicle of a Scientific Misconduct Case

This is the previously unpublished story of a professional nightmare, for accused and accuser, involving allegations of scientific misconduct, sometimes referred to as scientific fraud. The story arises from events at a major research institution, the Cornell University Medical College, in New York City. It is offered by SGR as a cautionary tale for all who might encounter similar circumstances in their own research settings. And in particular, it is offered to illuminate the bumbling performance in this matter of the esteemed National Institutes of Health, where the case has been under investigation since 1982—with final judgment often promised, but still not rendered.

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On December 14, 1981, Dr. Jerome G. Jacobstein, MD, met with Dr. Thomas Meikle, MD, Dean of the Cornell University Medical College, to discuss a sensitive and dangerous subject.

Jacobstein, an Associate Professor on the faculty since 1973, worked in the Laboratory of Nuclear Cardiology with an internationally renowned figure, Dr. Jeffrey S. Borer, MD. Moving to Cornell from NIH in 1979, Borer was a pioneer in the development of radionuclide cineangiography, a revolutionary technique for the filming and computerized analysis of the *in vivo* heart. It was rumored around the school that Borer would soon receive a full professorship and an endowed chair. It was also known that Borer and Jacobstein were in conflict over Borer referring to himself as "Director" of the lab, whereas Jacobstein insisted that they were "Co-Directors." Their once-congenial relationship was deteriorating, and in March 1982, Jacobstein left Cornell for his present post, Director of Nuclear Medicine at Graduate Hospital, Philadelphia.

But on December 14, Jacobstein wasn't meeting with the Cornell Dean to discuss honorifics or career prospects. Rather, he was there to raise a profoundly serious charge against Borer: Scientific misconduct in connection with a research abstract that a medical student, under Borer's supervision, had prepared for presentation to a meeting of the American Heart Association. Jacobstein had also been interested in having the student present the abstract at a meeting of the Society of Nuclear Medicine, but, as Jacobstein later described it, when he examined the abstract closely, a question about the reported methodology arose in his mind.

(Borer, in response to a telephone call from SGR, refused to discuss the case and referred the inquiry to Joanne Blauer, Secretary of the Cornell Medical College, who also refused to discuss the case. A call from SGR to Michael G. Kimberly, Cornell Deputy University Counsel, who has been handling the case for the university, has not been returned.)

The abstract drawing Jacobstein's attention referred to analysis of clinical data by "two independent observers," one of whom was clearly Borer. Knowing the staff, and wondering who the other observer was, Jacobstein questioned the student who had written the abstract. In a memo on the episode, Jacobstein wrote that the student "told me that Jeff [Borer] and one of the cardiolo-

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In Brief

A meeting with President Reagan was sought last month for the 108 school teachers named this year as recipients of the Presidential Award for Excellence in Science and Mathematics Teaching. Their guide during two days in Washington, the National Science Teachers Association, was advised as follows by the presidential schedulers: Line them up on the White House lawn and the President will wave to them from his helicopter. Offer declined.

Alvin Trivelpiece, chief of research at the Department of Energy, is said to be on the brink of succeeding William D. Carey as Executive Officer of the American Association for the Advancement of Science. Carey, 70, told the AAAS Board two years ago that he wanted out by December 1985, but, in characteristic AAAS fashion, efforts to find a replacement have dawdled along. An announcement, which was expected from last month's meeting of the AAAS Board, has reportedly been delayed while money and other details are worked out with Trivelpiece.

Just off the press: First issue of *The Scientist*, the national newspaper of science long planned and published by the Institute for Scientific Information. Plans call for coming out monthly for the rest of this year, and thereafter bi-weekly. The first issue is graphically appealing, journalistically pale. Editorial offices: 1101 15th St. NW, Suite 605, Washington, DC 20005; tel. 202/857-0355.

. . . The Cornell Dean Convenes an "Investigation"

(Continued from page 1)

gy fellows read the study together; when their readings were the same, they called that the official result, but when their readings were different, they used Jeff's result." Jacobstein quoted the student as agreeing that the term "two independent observers" was unwarranted, but, according to Jacobstein, the student said that "Jeff had told him to put that statement in."

Meanwhile, Jacobstein's memo continues, a paper based on the same clinical experiments covered in the abstract, and intended for publication, was proceeding through various drafts. Upon examining "the third or fourth" draft, he says, he encountered what he regarded as additional discrepancies. These concerned the randomization of patients, the positioning of the camera during cardiac stress tests, and, a minor point, the mechanical condition of the ergometer on the cycling equipment in the laboratory. (The paper was published in April 1983 in the *American Journal of Cardiology*, with Borer listed as an author.)

A Letter to Borer

Jacobstein says that he expressed his concerns to Borer, whom he rarely encountered in the course of work, in a letter dated November 23, 1981. But, while waiting for a reply—which never came—Jacobstein had another thought, which he describes in his memo as follows:

". . . I heard from a very reliable source that Jeff was about to be made a full Professor of Medicine at the medical college and that he was about to be appointed to an endowed chair . . . endowed specifically for his benefit . . . . I felt that if I was going to go to the Dean about what I then considered to be a case of scientific dishonesty at the least and possibly even scientific fraud, I ought to do it as quickly as possible so that the matter could be investigated before these appointments were made [to] save Jeff and the medical college, as well as the person who was going to endow the chair, substantial embarrassment were he to be found guilty." (Borer was subsequently appointed Roland Harriman Professor of Cardiovascular Medicine, New York Hospital-Cornell Medical Center.)

According to a confidential memorandum prepared by Joanne Blauer, Secretary of the Medical College, Jacobstein, in the December 14 meeting with Dean Meikle, "alleged in essence that Dr. Borer had deliberately misrepresented, in a preliminary draft of a paper a student was preparing for submission for publication, some of the methodology of the research . . . . Dr. Meikle met with Dr. Borer on December 16, 1981," Blauer's memorandum continued, "and informed him of the allegations Dr. Jacobstein had lodged. Dr. Borer presented his views to Dr. Meikle, denying Dr. Jacobstein's charge of deliberate misrepresentation." Dean Meikle responded by appointing an investigating committee—with membership, drawn from the faculty, acceptable to the parties and their department chairmen.

The Committee Meets

With the end-of-the-year holiday season looming, the committee, consisting of Drs. William Frosch, Richard Minick, and Donald Reis, met on December 18, 1981, from 2:30 to 9 pm. An official report of the committee meeting states that testimony was taken from Dean Meikle, Secretary Blauer, Jacobstein (who testified for two hours), Borer, and the student-author of the research abstract and paper. No other witnesses are mentioned. On the crucial issue of whether one or two observers participated in the research, the committee report states the following:

"The student's original draft stated: . . . 'Data was collected by an independent observer.' Dr. Borer revised these statements to read as quoted in the [Jacobstein] allegation. He [Borer] stated to the committee that all of the radionuclide cineangiograms were, in fact, read by two observers. He was one of the observers in every instance and the other was always a cardiology fellow, but not the same individual in every instance. Dr. Borer gave the names of these fellows to the committee."

The committee report does not indicate that the cardiology fellows were questioned. Jacobstein told SGR that he is "99 percent sure" they were not. The Cornell

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. . . Jacobstein Raises a New Misconduct Charge

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officials, as noted before, declined to discuss any aspect of the case with SGR.

After the witnesses had testified, Reis handwrote a short note to Dean Meikle: "Dear Tom, This evening Drs. Frosch, Minick, Ms. Blauer and myself spent six hours reviewing the charges that Dr. Jerome Jacobstein has made with respect to 'deliberate misrepresentations' made in a paper, in draft form, by Dr. Jeffrey Borer . . . . Our opinion, unanimously rendered, is that the charges do not warrant further action."

That would seem to be the end of the Jacobstein allegations against Borer, especially since Jacobstein would soon be leaving Cornell for a position in Philadelphia. But, in fact, the opinion of the Cornell committee was merely the prologue of what continues to this day as an ongoing marathon.

A Washington Lawyer

One week after the decision was delivered, Jacobstein wrote a protest to the President of Cornell University. He also made preparations to continue the struggle. Up to that point, Jacobstein had relied on a local, general-practice attorney for legal advice. But now, outraged by what he regarded as an unjustified verdict, he decided that he needed specialized assistance to carry on the case. After asking around, he hired a new lawyer, Harold P. Green, then a partner in one of Washington's powerful law firms, Fried, Frank, Harris, Shriver & Kampelman. Green, who later became Associate Dean of The George Washington University National Law Center, knows the ways of the scientific community from long years of involvement in nuclear-energy affairs, and is also highly regarded as a legal strategist.

Jacobstein says, and Green confirms, that Jacobstein has so far spent about $13,000 of his own funds in legal fees to pursue the case. Last year, when Jacobstein finally decided that he had spent enough money on the case, Green—who is at least as tenacious and as aroused as his client—agreed to continue the represenation on a *pro bono* basis.

But back to early 1982: While Green familiarized himself with the intricate details of the case, Jacobstein re-examined the only research paper he and Borer had ever published together, and came across what he regarded as further evidence of misconduct by Borer. The paper was published in the *American Journal of Cardiology* (AJC) in December 1981 after having been rejected by the *New England Journal of Medicine* (NEJM), which had suggested that a specialty journal would be the appropriate place of publication. Looking up a prepublication draft of the paper, Jacobstein found that it made reference to only one observer reviewing the clinical data on which the paper reported. But to his surprise, the version published in the AJC referred to "two observers." Jacobstein told SGR that subsequent inquiry failed to confirm his speculation that an NEJM reviewer may have faulted the research for employing only one observer. But he says that a reviewer did suggest that the methodology was weak. And, says Jacobstein, the insertion of a second observer strengthened the appearance of the methodology. But he says he didn't do it.

In March 1982, following several requests from attorney Green for documentary material concerning Cornell's dismissal of Jacobstein's allegations, Michael G. Kimberly, Cornell's Deputy University Counsel, sent Green a five-page "Summary of Investigation," prepared by Joanne Blauer, Secretary of the Medical College. With the summary was a copy of a letter to Cornell attorney Kimberly from Medical School Secretary Blauer, in which she stated that "there was no official record maintained during the investigation. Therefore, to comply with your request for a report of the proceedings, I reviewed the material on file and reconstructed most of the information from memory."

"Whitewash" Charged

In mid-April Green wrote back that the summary "made no reference whatsover to any documentary material (i.e., evidence) that may have been considered by the committee." Referring to the summary "as in the nature of a whitewash," Green introduced some ominous lawyerly terms, including an assurance that he was "eager" to resolve the case "in the least destructive manner possible." He also hinted that Jacobstein had evidence to support new charges against Borer—a reference to his post-hearing suspicions about the added "observer" in their joint paper.

Three weeks later, Cornell attorney Kimberly wrote to Green, expressing offense at Green's letter, and declaring that he was "reluctant to continue to respond to further informational requests at this time." Taking a turn at scare words, the university's attorney warned that Cornell "would consider as most serious any action which wrongfully damages the reputation of Cornell University or a Cornell University employe."

Green, meanwhile, had prepared and sent to Kimberly an acerbic analysis of the "Summary of Investigation," referring to it again as a "whitewash" and charging that "the procedures followed [by Cornell] in this case were virtually guaranteed to produce a conclusion that further investigation was not merited." Referring to the medical student involved in the preparation of the

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. . . NIH Agrees to Investigate the Allegations

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papers in dispute, Green noted that he was at an especially vulnerable point in his career, and that he was "placed in the position of giving testimony to the Committee directly contrary to the statements he made to Dr. Jacobstein."

Over the next few weeks, the two lawyers exchanged increasingly hostile letters. On June 8, 1982, Green wrote to Dr. William Raub, the NIH Associate Director for Extramural Research and Training: "We bring to your attention a rather unpleasant situation involving possible misrepresentation of research findings at Cornell Medical College." Green suggested there was more to the matter than had been brought before the Cornell committee in December 1981.

The NIH connection to the events in dispute was only indirect. Cornell University was then receiving about $30 million a year in research funds from the Department of Health and Human Services, parent agency of NIH, and the bulk of it went to the medical school. But NIH's only direct financial involvement in the disputed research projects consisted of $742 in summer salary for the medical student who found himself drawn into the Jacobstein-Borer strife.

Nonetheless, given its financial stake in the Cornell school, NIH couldn't ignore the allegations of misconduct. On July 26, 1982, Raub wrote to Green that "I would appreciate receiving a list of the publications and specific indications of the nature of the alleged irregularities." The NIH official also requested the "additional facts" that Jacobstein claimed to possess. The case was now removed from Cornell and was in the hands of an NIH bureaucracy that traditionally has skimpy staff resources and little stomach for confronting allegations of scientific fraud.

Four and a half years later—following an investigation from within NIH and the appointment of two outside experts in nuclear medicine to review the data—NIH has still not arrived at a final conclusion concerning Jacobstein's charges against Borer.

SGR spoke by telephone on October 2 with NIH's William F. Raub, who in August had been promoted to the No. 2 post at NIH, Deputy Director. Raub, who had presided over the case until his promotion, agreed, in response to our question, that the long duration of the case was unfair to both Jacobstein and Borer. "The blame for the length of the case belongs to all," he said. He added: "If there was nothing whatever to the allegations, you can reasonably assume we would have closed the case long ago."—DSG

(Next issue. Part II: NIH Investigates the Jacobstein-Borer Case.)

Massive Research Fraud Uncovered at UC San Diego

The School of Medicine at the University of California, San Diego, has made public the details of what it modestly describes as "extensive research fraud" by a former staff physician-researcher. The school has apparently come clean with the details of an astonishing six-year orgy of scientific counterfeiting and fakery. But the long-running episode so clearly reflects the ethical sogginess that infests much of contemporary science that it should be regarded as a starting point for concern and reform, rather than *finis* to an isolated bad incident.

The defrocked villain in the UC affair is identified as Robert Slutsky, 37, formerly of the Departments of Radiology and Medicine. Over six years prior to his detection in 1985, Slutsky submitted 161 manuscripts for publication, according to an inventory by an investigating committee chaired by Richard Peters, Professor of Surgery. There were periods in which Slutsky was grinding them out at the rate of one every ten days, which "was regarded as a fine accomplishment," according the Peters Committee reports. Of 137 that were published, in a total of some 30 journals, the Peters Committee concluded that 13 were clearly fraudulent and 55 were "questionable"—meaning supporting evidence was unobtainable. According to a press release from the university, Slutsky "was found to have falsified and misused data, and reported patient and animal studies which apparently were never done."

Like the formidable John Darsee, who blazed a similar paper trail at Emory and Harvard before he got caught in 1981, Slutsky listed many co-authors on papers—93, in fact, according to the UC inquest. Reviewing the circumstances involving this profusion of co-authors, the Peters Committee "found no reason to doubt the basic honesty of the co-authors . . ."

But the Committee also found that "Some colleagues and trainees were either flattered or embarrassed to have their names put on papers to which they had not contributed, and many lacked the authority or willpower to resist this practice. On the other hand, some faculty expected that their names [would] be used even though they had provided only facilities for a project, without substantive contribution to, or knowledge of, the validity of the work."

In regard to what has been referred to as "gift" authorship, Committee Chairman Peters offered the

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San Diego Report Recommends Ethical Uplift

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observation, as contained in a UC San Diego press release: "I think one message that comes across from this tragic incident is that anyone who lends his or her name to a paper should take his or her responsibility seriously."

The major issue that arises from this latest rampage of scientific fakery is simply this: Where were those celebrated safeguards—peer review, refereeing, and replication—that are supposed to detect both innocent and deliberate error? The answer is that the scientific version of the embezzeler is not often tripped up by these devices. More often, detection comes accidentally, rather than systematically. In Slutsky's case, for example, he was under review for a new appointment when a member of the committee noted shaky statistics in one of his published papers. One thing led to another, he was confronted, and quit.

But the fact is that his impossible output stirred no alarm. "The mechanisms to recognize and restrain an overproductive individual were either ineffective or not utilized," the Peters Committee stated, noting also that "Dr. Slutsky's role models in Cardiology and Radiology published a great deal."

Slutksy easily outwitted the refereeing system to get his papers published. How? "It seems likely," says the report, "that Dr. Slutsky satisfied reviewers' criticisms by putting the expected or requested methods and results in his publications whether or not the work had actually been done and regardless of the actual experimental results." After the papers were published, they went unchallenged as legitimate contributions to the medical literature—though the mythology of scientific probity insists that a fakery will inevitably out when efforts at replication of a hoked-up report fails. The reality is, however, that few experiments are repeated—one reason being that granting agencies are not keen to provide funds for repeating work that supposedly has been done before.

The report of the Peters Committee is a chronicle of a crashed system: "Review of publications by colleagues and senior department or division members was rarely carried out. Review of publications by many journals was ineffective in detecting even obvious discrepencies in procedures and statistics, as well as implausible technical accomplishments. The peer review of his grant request was far from searching, failing to detect both statistical errors and claims for extraordinary amounts of finished work."

The report provides astonishing disclosures about the research milieu at what is supposed to be one of the nation's preeminent centers of biomedical research: "There are no university regulations governing retention of research records and data (for possible challenge and review). Grant and contract documents must be retained for many years . . . But there is no requirement and little storage space provided for keeping the actual results of the research."

As for the co-authorship of Slutsky's papers, the report notes, "Some senior investigators interviewed freely acknowledged that the practice of gift co-authorship, where the only contribution was loan of equipment or space, was commonplace and condoned in their departments."

The San Diego report concludes with a series of recommendations to "ensure that every trainee will develop the desired sense of ethics in scientific research" and "to make fraud less likely and to facilitate its detection." But the suggested improvements are mainly notable as correctives for a state of ethical collapse: "Peer review of faculty should focus on the quality, not the quantity of published work. Work in which one does not have a significant role should not be counted."

Also, "Research supervisors should recognize a responsibility to review the experimental procedures, data analyses, and manuscripts of those working in their laboratories." It was also recommended that "Faculty should be informed that they may be asked to defend specific papers at the time of consideration for promotion."

The recommendations for an ethical uplift made no reference to the desirability of refraining from beating and robbing infirm elderly persons.—DSG

Research Ethics to be Discussed at Next AAAS Meeting

A symposium on "Ethical Norms in Science: Challenges and Opportunities" will be held at the next annual meeting of the American Association for the Advancement of Science, February 17, in Chicago.

The symposium is under the auspices of the National Science Foundation's program of Ethics and Values Studies. An announcement from NSF says the session will include a "report on studies examining ethical issues in the graduate education of science and engineering students, in research, and publication. Representatives from Sigma Xi and the AAAS Committee on Scientific Freedom and Responsibility will describe new initiatives under consideration by these organizations."

For additional information: Rachelle D. Hollander, Ethics and Values Studies, NSF, 1800 G St. NW, Washington, DC 20550; tel. 202/357-9894.

Research Budgets Survive Gramm-Rudman Fire

Nothing can be regarded as finally safe on the uncharted territory of Gramm-Rudman budgetmaking. But the research agencies generally fared well in the current session of Congress, and unless the deficit accountants turn everything topsy-turvy, the money situation looks reasonably good for the fiscal year that began on October 1.

The big winner, as usual, was the National Institutes of Health, scheduled for a cut in the President's budget, but enriched by the Congress, for a record total of $6.1 billion—nearly $1 billion more than last year.

The National Science Foundation got only half the increase requested by the Administration, but that still added up to an 8.7 percent increase over last year's figure—for another record total, $1.4 billion. The Senate was inclined to go for the full amount sought by the President, but this time, one of NSF's old and powerful friends in the House, Rep. Edward Boland (D-Mass.), Chairman of the NSF Appropriations Subcommittee, balked at the sum. Boland, who also presides over money for public housing and veterans affairs, suggested that science has been well treated in recent years and could ride out a bit of a slow down in growth to help social-welfare programs recover from the lean treatment of recent years.

The general science account at the Department of Energy went up from $655 million to $708 million, while Agriculture's Cooperative State Research Service rose from $276 million to $300 million.

There were some losers. The Department of Defense budget for basic research—about half of which goes to universities—went down from $960 million to $920 million, with most of the cut being applied to DOD's fledgling University Research Initiative. And R&D funds for the Environmental Protection Agency were reduced, from $213 million last year to $202 million for the current fiscal year.

This Could Hardly be Verse

Perhaps it was one of those events about which they say you had to be there to appreciate the telling. But, if only for maintaining a public record of the achievements of Washington-based educational advocacy, the following is noted:

An announcement from the Association of American Universities (AAU) states that the organization of 56 institutions held its fall meeting October 19-21 in Washington. "At the end of the discussion, the president of the association, Robert M. Rosenzweig, was directed by members to assure all interested parties that America's major universities are, as described by Chancellor William Danforth of Washington University:

"rich, but needy
powerful, but loved;
able to pursue institutional self-interest, but
in a spirit of altruism;
elite, but of the people;
effective, but not professional;
pure, but politically astute and adept;
economically successful, but incorruptible."

20 Contractors Get Bulk of Star Wars Funding, Study Says

Twenty contractors received 75 percent of the $7.7 billion expended by the Strategic Defense Initiative between 1983 and June 1986, according to the Council on Economic Priorities (CEP), a New York-based public-interest organization that has been critically tracking SDI spending.

Tops on the CEP list is the Lawrence Livermore National Laboratory, with $875 million. Next came General Motors, with $612 million; Lockheed, $580 million, Boeing and TRW, with $373 million each, and EG&G, $360 million.

The others in the top 20: McDonnell Douglas, $338 million; MIT Lincoln Lab, $327 million; Los Alamos National Laboratory, $285 million; GE, $260 million; Sandia National Laboratory, $226 million; Rockwell Int., $197 million; Teledyne, Inc., $181 million; Gencorp Inc., $175 million; SDI Institute, $125 million; Textron, $120 million; LTV Corp., $105 million; Flow General, $90 million; Raytheon, $81 million, and Martin Marietta, $77 million.

Correlating SDI expenditures with the geography of members of Congress, the CEP says it found, for example, that states of 15 of the 19 members of the Senate Armed Services Committee raked in 89 percent, or $4.5 billion, of all the SDI contracts awarded in fiscal 1985 and 1986. CEP President Alice Tepper Martin thereby concludes, 'It's just pork-barrel politics at work. By linking the SDI program to the economies of states traditionally dependent on defense spending and represented on key Congressional committees, the SDI can marshall support for a program despite its highly questionable strategic value and technical feasibility.

The figures on SDI spending are from a forthcoming CEP book, "Star Wars: The Economic Fallout," scheduled for publication in May by Ballinger/Harper & Row.

CDC Funds New Program for Health Promotion

In one of the rare health-area startups to take place under the Reagan Administration, three university-based centers for "health promotion" and disease prevention are being established with support from the Centers for Disease Control. The locations are at the University of North Carolina, the University of Washington School of Public Health, and the University of Texas Schools of Public Health.

The amount of support going to all three institutions is modest, a total of about $1.5 million for the first year. But the decision to invest in health promotion and disease prevention, rather than in the traditionally favored quest for cures, is something new on the health-policy scene. Among the preventionists, who have long felt neglected by the National Institutes of Health, the new CDC-supported program is regarded as a landmark event, in substance as well as politically. The old story of Congress and health, of course, is that once a program gets going, rapid growth often follows quickly.

To the Editor: AAU Report

SGR (Vol. XVI, No. 15) reported dissension in the staff ranks of the Association of American Universities over AAU President Robert M. Rosenzweig's opposition to Congressional earmarking of appropriations for specific universities. In response:

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I think you were misinformed. The article reporting on the meeting [July 29 with university represenatives and AAU staff] quotes a member of my staff as saying to me that Congressmen "don't need an educational effort. They disagree with you. Can't you understand that they simply disagree with you?"

Now, I have been known to miss the point on occasion, but I doubt that I would have missed that one or forgotten it. But the fact is that I remember no such statement by a member of my staff or by anyone else present, and I don't believe that such a statement was made, certainly not in that form.

The point is only important because (1) if records are to be kept, they should be kept straight; and (2) the quote leaves quite the wrong impression of the origin, purpose, and tone of the meeting. It was not called to quell revolt in the ranks, and it was not at all confrontational. Instead, different views were expressed civilly, and a useful program of action was agreed to.

Robert M. Rosenzweig

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[SGR editor's note: The AAU has discontinued its lobbying against earmarked appropriations and, following the meeting to which Rosenzweig refers, has appointed a committee to study the issue, as reported in Vol. XVI, No. 16.]

Is US Losing Edge in R&D?

From the "US Trade Position in High Technology: 1980-1986," report by Quick, Finan & Associates Inc., Washington consulting firm, commissioned by the Congressional Joint Economic Committee (74 pages, no charge), available from JEC, US Congress, SDG01, Washington, DC 20510; tel. 202/224-5171.

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In 1980, the high technology industries produced a trade surplus of $27 billion, but this surplus has declined in every year since [and it is] likely that 1986 will produce the first full-year high-tech trade deficit since this [trade] category was first identified . . . .

A US advantage in high-tech sectors due to its technology lead was supposed to insulate this sector from competitive price pressures. Obviously, if this was ever the case, it is not the case any longer . . . . The US-Japanese trade balance ["especially in electronics"] shows a consistent, extensive decline, despite fluctuations in exchange rates and relative rates of growth of the two nations' economies. While not part of this assessment, an important topic for further study is the . . . quality of the US technological base, with an appraisal of the degree to which any decline is related to an erosion of our qualitative advantages in research and development . . . .

The evidence collected from the US trade data suggests that in some high-technology sectors, the US technical and engineering work force may have lost its competitiveness and that the once-dominant qualitative advantages of the US R&D base may have been significantly narrowed.

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The following recent publications are available as indicated in the boldface headings—not from SGR.

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From National Academy of Engineering, Office of Administration and Finance, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202/334-2195

The Impact of Defense Spending on Nondefense Engineering Labor Markets (91 pages, no charge), disputes the proposition that the big surge in defense spending is pinching the supply of engineers for civilian sectors; says engineering manpower supply and demand are roughly in balance—one reason being that "job offers from defense firms have acted to offset declines in recruiting activity by the commercial sector and to absorb increases in the supply of engineering graduates." The issue of quality of manpower absorbed by defense was not addressed by the study, which was commissioned and paid for by the National Academy of Engineering. Harrison Shull, University of Colorado, Boulder, served as chairman.

The study, conducted over six months, was limited in scope, and is sure to be disputed, but it's one of the few serious attempts to examine the controversial issue of the domestic effects of the Reagan defense buildup.

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From Department of Energy, Division of University and Industry Programs, Office of Energy Research, Washington, DC 20585; tel. 202/252-8949

University Research & Scientific Education Programs of the US Department of Energy (32 pages, no charge), describes the $350 million in campus-based programs supported by DOE, plus DOE-owned R&D facilities available for university use.

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From the Congressional Budget Office, US Congress, 2d and D Sts. SW 20515; tel. 202/226-2600

Setting Space Transportation Policy for the 1990s (52 pages, no charge), against the background of the Challenger destruction and ongoing debate about US launch-capacity requirements, CBO states that "NASA, DOD, and NASA contractors have consistently overestimated launch demand." CBO disputes NASA's forecasts of a need for 30 "shuttle flight equivalents per year" from 1986-2000; the real load is more likely to be no higher than 16.5 per year, says CBO, and can be met "without acquiring new launch capacity."

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From National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202/334-3313

The Medical Implications of Nuclear War (619 pages, $33.50 paperback; $43.50 hardcover), proceedings of a symposium held last year by the Institute of Medicine, National Academy of Sciences; includes papers on environmental and health consequences of nuclear war, medical-service requirements, "psychosocial perspectives," and long-term consequences and prospects for recovery.

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From Gale Research Co., Book Tower, Detroit, Michigan 48226; tel. 313/961-2242

Science and Technology in the USA (408 pages, $95.00), edited and with chapters by Albert H. Teich and Jill H. Pace, plus 12 specialists in science policy and related matters; sketches the development of the American scientific and technologial enterprise, discusses the political setting, and describes the government, industrial, and non-profit sectors.

Produced by the British publishing firm Longman, this is the fifth in the series of the Longman World Guide to Science and Technology. Previous volumes have covered the Middle East, Latin America, China, and Japan.

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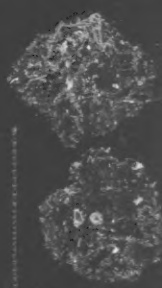
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